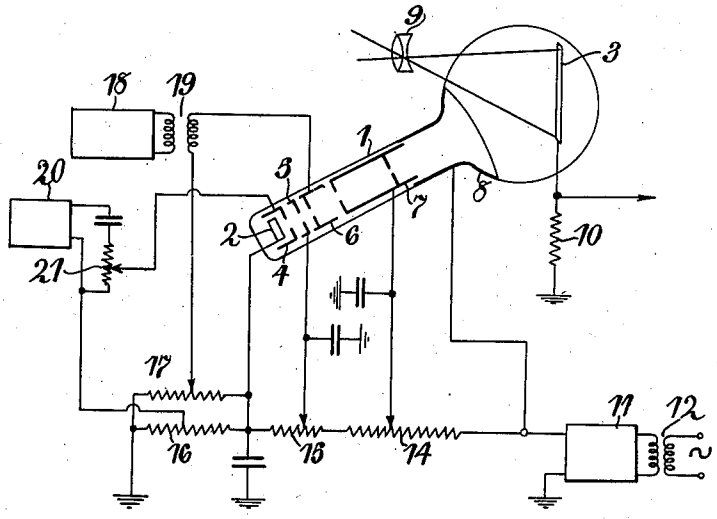
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SIGNALING SYSTEM

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Inventors
John Edgar Keyston
Leonard F. Broadway
By H. S. Grover
Attorney

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SIGNALING SYSTEM

John Edgar Keyston, Hayes, and Leonard Francis Broadway, Hillingdon, England, assignors to Electric & Musical Industries Limited, Hayes, Middlesex, England, a company of Great Britain

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1 Claim. (Cl. 178—7.2)

The present invention relates to cathode ray tube circuit arrangements for television and like purposes.

Cathode ray tubes are known in which an image of an object to be transmitted, such as a frame of a motion picture film, is projected on to a mosaic screen, the screen being scanned by a cathode ray from a suitable gun for the purpose of generating picture signals.

The mosaic screen may be constituted by a plurality of small, discrete photo-electric elements each having capacity to a common signal plate, or by a plurality of mutually insulated conducting elements, one side of the screen being made photo-electric and has an optical image of the object to be transmitted projected upon it, while the other side is arranged to be scanned by the cathode ray. Furthermore, the mosaic screen may comprise a plurality of mutually insulated conducting elements which are not photo-electrically active; in this case, an electron image may be focused on to the mosaic screen, by any suitable electron-focusing means, from a photo-electric surface on which an optical image of the object to be transmitted is projected. The invention is also applicable when the mosaic screen in the last-mentioned case takes the form, for example, of a sheet of mica, or other material which has a high resistance in the plane of the surface on which the electron image is focused.

It has been proposed in a television system utilising a transmitting tube embodying a mosaic screen to modulate the intensity of the ray at the frequency of a transmission carrier; for this purpose, carrier frequency oscillations have been fed to a control electrode forming part of the gun, the output of the device then taking the form of a carrier wave modulated by the picture signals. It has further been proposed to feed synchronising signals to the control electrode referred to above, in addition to the carrier oscillations.

It is an object of the present invention to provide a cathode ray tube circuit arrangement in which improved means are provided for effecting modulation of the electron beam.

According to the present invention, in a circuit arrangement embodying a cathode ray tube comprising a cathode, a screen, means for focusing electrons from said cathode in a narrow beam upon said screen, and two electrically separate electrodes arranged in succession along the path of the ray between said cathode and said screen, there are provided means for enabling modulating potentials of different characters to be applied to said two electrodes respectively.

In a preferred form of the present invention, a circuit arrangement comprises a cathode ray tube of the double acceleration type, that is, a tube in which electrons from the cathode undergo at least two accelerations during their passage from the cathode to the screen, and are subjected between two of said accelerations to a deceleration. Such a tube may comprise a cathode and a screen, such as a mosaic screen, and, arranged between the cathode and the screen in the following order, a cathode screen, an accelerator electrode, a modulator electrode and one or more anodes; in operation, the accelerator and the anode or anodes are maintained at suitable positive potentials relative to the cathode and serve to accelerate electrons from the cathode, the cathode screen and the modulator electrode are maintained at negative potentials relative to the cathode, so that the modulator serves as a decelerator, and modulating potentials of different characters are applied between the cathode screen and the cathode, and between the modulator electrode and the cathode respectively.

When such a tube is employed in a television transmission system, an image of the object to be transmitted is projected on to the mosaic screen, and the electron beam is deflected by electrostatic or electromagnetic means, in known manner, so as to scan the screen. In such an arrangement, according to one aspect of the present invention, oscillations at a carrier frequency are applied between the modulator and the cathode, and synchronising signals are applied between the cathode screen and the cathode, the output of the tube then being in the form of a carrier oscillation modulated both by picture signals and by synchronising signals.

The synchronising signals may be arranged to reduce the intensity of the electron beam to zero, so that the synchronising signals are represented in the modulated carrier by intervals of zero carrier amplitude.

The application of the carrier oscillations and the synchronising signals to different control electrodes has the important advantage over the known arrangement referred to that it can readily be arranged that there is substantially no coupling between the carrier source and the source of synchronising signals, and interaction between these sources can thus be avoided.

In some cases, it may be desired to maintain the level of the transmitted picture signal substantially constant; for this purpose, there may

be developed a signal proportional to the average brightness of the picture from time to time, and this signal, either alone or together with the synchronising signals, may form the modulating potential applied to the cathode screen.

It will, of course, be clear that the present invention is applicable to cathode ray tubes embodying a fluorescent screen, such as are employed for television reception.

The invention will be further described with reference to the accompanying drawing, which shows, by way of example, a circuit arrangement according to the invention embodying a transmitting cathode ray tube.

Referring to the drawing, the tube 1 has a cathode 2, a mosaic screen 3, and, arranged between the cathode and the screen in the order named, the following electrodes a cathode screen 4, an accelerator 5, a modulator 6 and first and second anodes 7 and 8. An image of an object to be transmitted is cast upon the mosaic screen 3 by means of lens system 9, and picture signals for transmission are taken off from resistance 10.

Operating potentials are supplied to the electrodes of tube 1 from the mains by means of a rectifier 11 which is connected to the mains through transformer 12. A potential divider comprising resistances 14, 15 and 16 in series is connected in shunt across the output of the rectifier 11, and the cathode of tube 1 is connected to the join of resistances 15 and 16. The accelerator 5 and the first and second anodes 6 and 7 are connected to points at progressively increasing positive potentials in the potential divider, and the cathode screen 4 is given a negative bias relative to the cathode 2 by connection to an adjustable tapping point in resistance 16; the modulator 6 derives a negative bias from an adjustable tapping point in a resistance 17 connected in shunt with resistance 16.

Carrier frequency oscillations are fed to modulator 6 from source 18 through transformer 19, and synchronising impulses from source 20 are taken off from resistance 21 and applied to cathode screen 4.

The synchronising signals are preferably fed to the cathode screen 4 in the negative sense, and at such a level that they reduce the intensity of the cathode ray to zero, so that, in the signals set up across resistance 10, the synchronising signals are represented by periods of zero carrier amplitude. Any known or suitable means may be provided for varying the amplitude of the carrier oscillation applied to modulator 6.

The invention is not limited to the arrangement described by way of example above, and many modifications of the invention, within the scope of the appended claim, will occur to those versed in the art.

We claim:

A television signaling system comprising a cathode ray image transmitting scanning tube, said tube having included therein means including an electron source to develop a cathode ray beam and a photoelectrically responsive mosaic electrode adapted to receive a light image of which an electro-optical replica is to be produced at receiving points and a signal plate element associated with the mosaic electrode, a signaling circuit connected with the signal plate electrode, means comprising a plurality of electrode elements to accelerate and focus the developed cathode ray beam upon the mosaic electrode, means to deflect the cathode ray beam in a predetermined traversal pattern relative to the mosaic electrode to release energy to the signal circuit which is proportional to the brilliance of the optical image cast upon the mosaic, a source of synchronizing signal energy, a plurality of modulating electrodes intermediate the electron source and the mosaic and along the path of the electron beam, one of said modulating electrodes being located nearer the electron source than one of the accelerating electrodes and the other of the modulating electrodes being located nearer the mosaic than the said accelerating electrode, an electrical connection to supply the generated carrier to one of the modulating electrodes so that the signal impulses in the signaling circuit are modulations of the said carrier frequency, an electrical connection to supply the synchronizing signals to the other of the modulating electrodes to suppress the cathode ray beam at predetermined intervals, said independent connections to the modulating electrodes being such that direct interaction between the carrier frequency energy source and the synchronizing signal energy source is reduced to a minimum value.

JOHN EDGAR KEYSTON.
LEONARD FRANCIS BROADWAY.